Industronics

Design, Application and Service of Electronics in Industry

Monitron User Manual

For Version S 3.26E

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27 Wanganui Road Kirrawee NSW Australia 2232

Phone: (02) 9545 6181 Fax: +61 2 9545 6181 Mobile: 0419 267 889
Email: info@industronics.biz WWW: http://www.industronics.biz
A division of D.H. Enterprises Pty Limited A.B.N. 72 087 000 995

Overview

The Monitron is an upgrade for either an Impresstik Monitor on Unitron Control Box. The entire front panel and control board is replaced providing a more reliable and fully featured controller. If an older type incandescent label gap sensor was used this must be upgraded to a 24 volt fork type sensor. Apart from this, it is simply a matter of plugging the upgraded box into the old position and learning the new controls. All of the adjustments are made with three pushbuttons on the front panel. There is a two line by twenty-character LCD display for viewing the settings. Settings can also be adjusted via a serial port if this option is installed. The firmware used is exactly the same as in the current Servotron controller. On a re-initialise simply select Monitron. The menu structure below is lifted directly from the Servotron User Manual. Other sections have changes to suit the different hardware. Starting from August 2010, Monitrons may be converted to suit the newer Bergher Lahr Stepper motor that has the drive electronics integrated into the motor. The firmware does not differ for this conversion but be sure to use the correct tables at the end of this manual as significant hardware differences exist.

Menu Structure

If your Monitron has firmware later than S3.22C then use the Servotron Manual for the menu structure. For all other details use this manual.

```
InStep 2 Ver S 3.22C
  By Industronics
```

This is the opening screen. If Enter is pressed and held during this screen, the controller will display the initialisation menu. Refer to the end of this section for details.
If Enter is not pressed the following menu is displayed after a ten second delay:

Level One Menus

```
Label Counter
            0
```

The Label Counter is displayed here. This shows the total number of labels dispensed since the last count reset. Pressing Enter will reset the label count. As at Version 3.18 if the counter memory option is installed and enabled in Option2 menu the count will be retained through a power down otherwise it is lost. Pressing the down arrow displays the following screen:

```
Label Position
            0
```

The Label Position setting is displayed here. This sets the delay in steps between the product sensor activation and the start of dispense effectively changing the position of the label on the product. Press Enter to enter Edit Mode, a flashing arrow is displayed to the right of the value when in edit mode. Whilst in edit mode the arrow keys can be used to adjust the value. When the correct value is displayed press Enter to leave Edit Mode. Whilst not in edit mode pressing the arrow keys moves to another menu item. Pressing the down arrow displays the following screen:

```
Label Advance
          100
```

Or

```
Fixed Move Length
          100
```

This is the second menu in level one. The Label Advance or the Fixed Move length setting is displayed here. Which is displayed is determined by bit 0 in the Option 2 menu in level three. The label advance menu sets the number of steps to move after the gap sensor has activated. If the deceleration is adjusted, this value must be entered again to subtract the deceleration steps from the entered advance value. The fixed move length menu sets the total length of the fixed move when that mode is selected. Both of these menus use the same memory location for value storage, so changing one changes the other.

Other menus may appear here. These can be: “Two Label Spacing” together with “2 Label 1st Advance” and/or “Jig Delay” together with “Jig Hold Delay” and/or “Spin Up Delay” and/or “Air Blast Time” in this order. They appear here in the top level menu when they are enabled and down in the second level if disabled. This allows the menus to self-customise to the application and prevents clutter of the top level menu. Refer to the appropriate menus in the second level for further details.

```
Sync Ratio
          128
```

If the sync ratio has been set to 255 to ignore the master encoder, the Set Speed menu will be shown here otherwise the Sync Ratio setting is displayed here. This sets the sync ratio between the master encoder and the output pulse rate, 0 is 50%, 239 is 800%. A value of 255 causes the master encoder to be ignored and the set speed value to take effect. Always use 255 in a converted Monitor as no encoder connection is present. Pressing the down arrow displays the following screen:

```
    Labelling is
      Enabled
```

Pressing Enter cycles between “Enabled” and “Disabled”. This menu is provided to allow for re-enabling after an ignored fault of to disable so that the product sensor is ignored or the drive roller can be turned by hand.

Other menus may appear here. This depends on the option card that has been fitted and which options have been enabled. Refer to the appropriate option manual for further details. Otherwise pressing the down arrow displays the following screen:

```
Level Two Menus
```

Pressing the down arrow rolls around to the “Label Counter” menu. Pressing Enter takes you to level two menus and displays the following screen:

Level Two Menus

```
Manual Dispense
Press Enter to Start
```

Pressing Enter starts a labelling cycle. Pressing the down arrow displays the following screen:

```
Printer
      Disabled
```

The Printer menu is shown here. Pressing Enter cycles between Disabled and Enabled. Use the “Option Menu” to select the type of printer fitted and the “Option2 Menu” to select the type of printer fault signal. Pressing the down arrow displays the following screen:

```
End of Reel Count
      3      3
```

How the “end of reel count” functions is determined by a bit in the Option2 menu. With this bit on, the setting here is the number of labels that can be dispensed in between operations of the ‘end of reel’ sensor. The sensor detects the movement of the label reel. In this mode, the number set here is usually quite low. With the bit off, it sets the number of labels that can be dispensed while the ‘end of reel’ sensor is on. The sensor detects that the label reel is low in diameter. The setting is usually larger in order to allow the reel to become very close to finished before the head stops. In both modes the setting depends on the label length. The number on the left is the actual count. It is a ‘live’ value and is provided to assist in establishing the correct setpoint. Pressing the down arrow displays the following screen:

```
Length Measure
```

Whilst this menu is displayed the actual dispensed label length in steps is displayed at the completion of every cycle. Pressing Enter when there is a length displayed will calculate the missing label length and load it into the next menu. Pressing the down arrow displays the following screen:

```
Missing Label Length
          5
```

From version 3.06 to 3.19A the missing label function worked like this:
If a label dispense takes more than the number of steps set here the labeller will disable, show “Labeller error” and turn on the Bussed Fault Output. A value of 0 allows infinite length, 1 = 256, 2 = 512, 3 = 1024, 4 = 2048, 5 = 4096, 6 = 8192, 7 = 16384 and 8 = 32768 steps.
From version 3.20 on it can work in either of two ways:
If the value entered here is less than 64 the missing label function works as above except that the number of steps is set differently. The number of steps at which the labeller will stop is 256 times the value set here. So a value of 16 gives the same as the old default value of 5 (256 x 16 = 4096). This gives a much more precise way to set the trip point.
If the value is greater than 63 the “no gap skip” style of missing label is implemented. This allows the labeller to skip past missing labels (or blocked label gaps) as if they never happened. It works by simulating the label gaps presence at the number of counts specified here. So the number entered here should be the label length minus the label advance setting. You can enter this manually or by pressing Enter after the length is displayed in the previous menu. If the actual gap occurs after the gap is simulated, the actual gap position will override the simulated one to maintain correct registration. If you change the advance after setting this value you should redo this setting to cater for the new advance value. If the “gap skip” is done four times consecutively the labeller will disable, show “Consec. Miss Regist.” and turn on the Bussed Fault Output.
Pressing the down arrow displays the following screen:

```
Set Speed
          0
```

If the sync ratio has been set to 255 to ignore the master encoder, the Sync Ratio menu will be shown here otherwise the Set Speed setting is displayed here. This is the dispense speed when no master encoder is used, i.e. Sync Ratio set to 255. Values less than 5000 give a very slow dispense speed, while values approaching 9999 give a very fast speed. Pressing the down arrow displays the following screen:

(Note: the following six menus may not appear here but in the top level menu if they are enabled.

```
Two Label Spacing
          0
```

The Two Label Spacing setting is displayed here. This setting sets the number of steps to pause between the first and second label of a set. A value of 0 turns this function off. Pressing the down arrow displays the following screen:

```
2 Label 1st Advance
          0
```

The advance setting for the first label of a two label set is displayed here. When two label spacing is turned on in the previous menu this setting controls the stopping position after the first label is dispensed. The normal advance setting is used for the second label. Pressing the down arrow displays the following screen:

```
Jig Delay
          0
```

The Jig Delay setting is displayed here. This setting sets the number of steps between product sensor activation and the activation of the jig solenoid. A value greater than zero enables “Jig Control Mode”. If you select this mode you must select a mode in the “Spin Up Delay” as well! If Knife mode is selected in the Option2 menu this value cannot be changed from off! Pressing the down arrow displays the following screen:

```
Jig Hold Delay
            0
```

The Jig Hold Delay setting is displayed here. This setting sets the number of steps between the completion of the dispense and the deactivation of the jig solenoid. It is up to the operator to ensure correct product spacing. You must ensure the product is released before the following product is detected by the product sensor or that product will be ignored. This setting is only used when in Jig Control Mode which is enabled by the menu above, so you can leave the value in here when it is disabled. Pressing the down arrow displays the following screen:

```
Spin Up Delay
            0
```

The Spin Up Delay setting is displayed here. This setting can enable one of two modes. In both modes the sequence is started by the "Jig In" input. A value of 1 puts the InStep into "Jig Only Mode". In this mode, the Jig In sensor simply triggers the normal cycle instead of the product sensor. When a larger value is entered, the "Orient Jig Mode" is turned on. This command sets the number of steps to pause before the registration scanner is enabled. This is to ensure the product is spinning in the jig at the correct speed. In orient jig mode the cycle is initiated by a sensor connected to the "Jig In" input. This initiates the spin up delay. When this is complete, the sensor connected to the "Colour Sensor" input is enabled. When the colour sensor sees a leading edge the normal dispense sequence is started. A value of 0 turns both jig modes off. Pressing the down arrow displays the following screen:

```
Air Blast Time
            0
```

Or

```
Knife Down Time
            0
```

The menu displayed here depends on whether Knife mode is selected in the Option2 menu. If Knife mode is not set then the Air Blast Time is displayed, this sets the air blast time in milliseconds. The air blast is for machines with an air box attachment. The air blast time occurs after the product delay and before the label starts to move. If Knife mode is selected then the Knife Down Time is displayed, this sets the knife down time in milliseconds. As soon as the dispense stops the air blast output is turned on for the set time to bring the knife down. Pressing the down arrow displays the following screen:

```
 Library Functions
```

Pressing the down arrow displays the “Level Three Menus” selection screen further below. Pressing Enter takes you into the Library sub-menu and displays the following screen:

```
Save to Library No.
            0
```

This is the first menu in the library sub-menu. Pressing Enter allows you to select the library number to save to with the arrow keys. After selecting, pressing Enter saves all of the data from the current data memory and displays the “Library Functions” menu. (There is no library number zero, it is provided to allow a way to “escape” without saving.) Pressing the down arrow displays the following screen:

```
Read from Lib No.
            0
```

This is the second menu in the library sub-menu. Pressing Enter allows you to select the library number to read from. After selecting, pressing Enter reads the library and saves it to the current data memory. If after pressing Enter, the “Library Functions” menu is not displayed, the data in the selected menu was invalid. Select another library number or select 0 to escape from this menu. Pressing the down arrow displays the “Library Functions” menu.

```
Level Three Menus
```

Pressing Enter takes you to level three menus and displays the “Acceleration” menu. Pressing the down arrow displays the following screen:

```
Level One Menus
```

Pressing Enter takes you to level one menus and displays the “Label Counter” menu. Pressing the down arrow displays the Printer menu.

Level Three Menus

```
Acceleration
             3
```

The Acceleration setting is displayed here. This menu selects one of six acceleration ramp profiles. A value of 5 is the softest, 3 is normal. Pressing the down arrow displays the following screen:

```
Deceleration
            10
```

This is the second menu in level three. The Deceleration setting is displayed here. This menu adjusts the number of steps to decelerate for. This setting is read-only at present. Pressing the down arrow displays the following screen:

```
Inputs:  PGDSPEJC
         00000000
```

This is the third menu in level three. The input status is displayed here. A value of 1 indicates the input is on, 0 is off. The letters above the value indicate what the input is used for.
P – Product Sensor
G – Gap Sensor
D – Disable Input (Fault In)
S – Servo OK
P – Printer OK
E – End of Reel Input
J – Jig In / Product Gate Input
C – Colour Sensor
The display is not live, pressing Enter updates the display.
Pressing the down arrow displays the following screen:

```
Outputs: XFABJSEC
         00000000
```

The output status is displayed here. A value of 1 indicates the output is on, 0 is off. The letters above the value indicate what the output is used for.
X – Spare
F – Fault Output
A – Air Assist Output
B – Air Blast Output
J – Jig Solenoid Output
S – Feedscrew Enable Output
E – Servo Enable / Stepper Boost Output
C – Coder (Printer) Output
The display is not live, pressing Enter updates the display. As of version 3.21 set/reset of outputs for testing is allowed. This uses the new bit editing method introduced in this version. With this new version pressing Enter takes you into edit mode as usual however the arrow keys move the cursor up and down through the different bit positions. When the Enter key is pressed it alternatively set/resets the highlighted bit. To exit edit mode you must move the cursor back to the arrow at the right of the value and press Enter.
Pressing the down arrow displays the following screen:

```
Master Speed
            0
```

The speed of the master encoder is displayed here. It is used to check the operation of the master encoder. If the master encoder rate is too fast “fast” will be shown. Extremely slow encoder rates cause “Slow” to be displayed. If a dispense has been attempted when the master encoder is stopped it will display “Stopped!” The display is not live, you need to press Enter to update display. Pressing the down arrow displays the following screen:

```
Options: GSGEC421
         00000000
```

The option status is displayed here. A value of 1 indicates the option is on, 0 is off. The letters above the value indicate what the input is used for.
G – Gate Signal Required
S – Servo Mode (Not Stepper). On for speed compensation and servo enable. Off for stepper drives.
G – SIG drive compensation. Must select servo mode above as well!
E – Enable at Power On
C – Moving Type Coder e.g. inkjet (0 = Stationary Type e.g. stamping hot foil)
421 – Serial Address Select (Set bits to total to desired address, all off = 8)
Pressing Enter takes you into bit edit mode. Refer to the output menu for details on ‘bit edit mode’.
Pressing the down arrow displays the following screen:

```
Option2: EMCKBSPF
         00000000
```

The second option status menu is displayed here. A value of 1 indicates the option is on, 0 is off. The letters above the value indicate what the input is used for.
E – End of Reel Mode. When on selects reel turning detection type and when off selects reel diameter low or no web type detection. Set to 0 if no end of reel sensor is fitted. Refer to EOR menu.
M – 1000M Mode. When on changes the functions of the Printer OK and Fault In inputs. Print OK changes to Safety Circuit Activated and Fault In changes to External Enable.
C – Counter Memory. If the counter memory option is installed it should be enabled here. Enabling this function prevents serial communications from working! Was labelled M in V3.18.
K – Knife Mode. Changes the air blast function into a label cutter function. Normally used in a Reeltek Protag application machine.
B – Stepper Boost. When on changes the servo enable output function to a stepper drive boost.
S – Servo OK input polarity. When on here the Servo OK input is off = OK. Can be used when no servo ok signal is available. (i.e. in a Monitron)
P – Printer Fault polarity. When the printer is enabled in level 2 the Printer Fault input becomes active. The level that causes labelling to be stopped is entered here. 0 = on, 1 = off.
F – Fixed Pull Mode. This is different from InStep I fixed pull mode, it is triggered by the product scanner.
Pressing Enter takes you into bit edit mode. Refer to the output menu for details on ‘bit edit mode’.
Pressing the down arrow displays the following screen:

```
AnlgOut: ?GIO?VCF
Options: 00000000
```

The analogue output option status is displayed here. The settings are only relevant if the Analogue Output Option Board has been fitted. A value of 1 indicates the option is on, 0 is off. The letters above the value indicate what the input is used for.
G – Guarding closed input monitored. Not implemented!
I – Infeed Low Sensor monitored. Not implemented!
O – Outfeed High Sensor monitored.
? – Spare.
V – Vacuum Belt Speed Adjustment enabled.
C – Conveyor Speed Adjustment enabled.
F – Feedscrew Speed Adjustment enabled.
When the speed adjustments are disabled they are shutdown and the menu screens removed.
Refer to the Analogue Output Option Board manual for further details.
Pressing Enter takes you into bit edit mode. Refer to the output menu for details on ‘bit edit mode’.

Pressing the down arrow displays the following screen:

```
Level Two Menus
```

Pressing Enter takes you to level two menus and displays the “Manual Dispense” menu. Pressing the down arrow displays the following screen:

```
Level One Menus
```

Pressing Enter takes you to level one menus and displays the “Label Counter” menu. Pressing the down arrow rolls around and displays the Acceleration menu.

Fault Screens

The following screens appear when the fault occurs. If multiple faults occur only the first one is displayed. If subsequent faults are still present when earlier ones are reset they will then be displayed. If the fault is rectified the screen can be cleared and the labeller re-enabled by presssing Enter. If you would like to review your settings without resetting, the first press of either arrow key will bring back the menu that was present before the fault occurred. You can then move around the menus as usual. Afterwards, you can re-enable the labelling by using the “Labelling Enable” menu in Level 1.

```
Labeller Error!
Press Enter to Reset
```

This screen indicates that the servomotor has moved further than that set by the missing label length. It is usually caused by a wrongly setup gap sensor or slipping drive rollers. It can always be reset immediately. Refer to the “Missing Label Length” menu in level two for adjustment.

```
Consec. Miss Regist.
Press Enter to Reset
```

This screen indicates that the labeller has had to simulate the gap sensor more than three times in a row. It is usually caused by a wrongly setup gap sensor or slipping drive rollers. It can always be reset immediately. Refer to the “Missing Label Length” menu in level two for adjustment.

```
Printer Error!
Press Enter to Reset
```

Whenever the printer is enabled (and the 1000M bit in Option2 menu is off) the printer fault signal is also enabled. The sense of the input is controlled by a bit in option port 2 or by the ‘D’ command. If no printer fault signal is available it should be set to off = OK (default). The fault signal must be removed before it can be reset.

```
External Fault!
Press Enter to Reset
```

This screen appears when the Fault In input is activated (the 1000M bit in Option2 menu must be off). This input is usually tied together with all of the other Fault In/Fault Outs on the machine so that a fault on one label head will disable all heads.

```
Servodrive Error!
Press Enter to Reset
```

This screen appears when the connected servo drive has indicated a fault. You usually must power down the servodrive to reset the fault. If the fault occurs often it will be necessary to open the enclosure to check the fault code indicated on the front of the servodrive. Refer to the servodrive manual for the fault codes meaning and its remedy. It is usually caused by a web jam up.

```
End of Label Reel!
Press Enter to Reset
```

This screen appears when the “End of Reel” has been detected. It can be reset straight away. Refer to Option2 menu and End of Reel Count menu for correct type setup and count setting.

```
Orientation Error!
Press Enter to Reset
```

As of version 3.17C and when in Jig Control and Orient Mode, the product sensor is monitored while the jig is closed and should it be activated again the jig opens and this fault is displayed. At the time of jig closure the product sensor input is checked. If it is on (usually caused by large products in the jig) then this failure checking is disabled as there is no way to check for subsequent products coming. Whether this checking is disabled or not you can always release a jig stuck in due to failure of the colour sensor to detect the mark by pushing any button!

```
Safety Circuit Open!
Press Enter to Reset
```

This screen appears when the "1000M" bit in Option2 is set and the 'Print OK' input is on. In this setup a N.C. contact on a safety contactor is connected to what is usually the 'Print OK' input. You must reset the safety circuit before you can re-enable.

```
 Labelling Disabled
 By External Input
```

When the "1000M" bit is set the 'Fault In' input becomes the External Disable Input. This message is displayed when the input is on and automatically returns to the previous menu when turned off. In this mode, this input can also be used to reset other faults!

Other fault screens may appear depending on the option card fitted and which functions are enabled.

Initialisation Menu

This menu can only be entered during power up. It will automatically appear if the controller detects invalid data in the current data memory or it can be forced to appear if Enter is pressed and held during the initial screen that displays the version number information. It will appear as either of the two following screens:

```
   Enter Pressed
Use ^ to make choice
```

or

```
EEPROM Data Invalid!
Use ^ to make choice
```

If the up arrow is pressed, the following screen will appear:

```
   Enter Pressed
  Erase Libraries
```

This is the first choice in the initialisation menus. Pressing Enter causes all of the Library data to be erased then the first initialisation menu is shown again. Pressing the up arrow causes the next menu to be displayed as follows:

```
   Enter Pressed
   Reinitialise?
```

This is the second choice in the initialisation menus. Pressing enter drops into the type selection sub-menu. The first menu is as follows:

```
    Select Type
Use ^ to make choice
```

If the up arrow is pressed, the following screen will appear:

```
    Select Type
     Servotron
```

Pressing Enter causes all of the current data to be reset to default values and then display the first menu in level one. Because of this, if you want to erase libraries and reinitialise you must erase libraries first. Pressing the up arrow will cycle through the following selections: "Servotron 2001", "Model 500", "Monitron", etc, "Do Nothing" and back to "Servotron".

Pressing the up arrow causes the next menu to be displayed as follows:

```
   Enter Pressed
     Do Nothing
```

This is the third choice in the initialisation menus. Pressing Enter simply displays the first menu in level one and as the menu suggests, does nothing. If the entry into the initialisation menus was caused by invalid data you can't use this option, but must select reinitialise. Pressing the up arrow causes the first initialisation menu to be redisplayed.

Inputs

All inputs signals that are available on a Servotron are present however only a few are wired to the connectors on the rear. This is to maintain compatibility with the original Monitor. The signals not brought out to the rear panel are available on the adapter board, In an ex-Monitor at TB1and in an ex-Unitron at T1 and T2. All inputs are selectable by jumpers on the InStep II PCB for NPN (1 to 2) or PNP (2 to 3) input devices. The function of each input follows.

Product Sensor

This input initiates the labelling sequence. It starts with a transition from off to on of this input. See jumper J7 for input polarity selection. Terminal 1 on a Monitron.

Gap Sensor

This is the registration input. It is normally connected to a fork sensor that detects the gap between the labels on the backing paper. The label advance starts counting with an off to on transition of this input. See jumper J8 for input polarity selection. Terminal 2 on a Monitron.

Master Encoder

This is where the encoder for the product speed is connected. The encoder is usually coupled to the conveyor or vacuum belt of the machine. See jumper J12 and J13 for input polarity selection and J11 for voltage. The pulses per rev of the encoder and its gearing to the conveyor / belt should be selected so that the rate is the same as the step rate of the motor. It is best to be on the low side of one to one if this cannot be achieved. The encoder should have an open collector 5 or 24VDC output. The Monitor had no support for a master encoder but the input is available on TB1/11. It is terminal 16 on an ex Unitron.

IN1 – Colour Sensor (Product Sensor 2)

This input only functions in Orientation Mode. It triggers the labelling cycle just as the normal product scanner does but only after the orient part of the cycle is complete. See jumper J1 for input polarity selection. TB1/4 on a Monitor adapter board. T1/1 on a Unitron adapter board.

IN2 – Jig In Sensor/Product Gate

This input is usually a proximity detector mounted on the orientation jig to indicate when the jig is closed. It initiates the spin up delay in orient jig mode. If the Gate Input is selected on the option port this input becomes the product sensor gate input. In this mode this input must be on before a product detection will start the dispense cycle. See jumper J2 for input polarity selection. TB1/5 on a Monitor adapter board. T1/2 on a Unitron adapter board.

IN3 – End of Reel

This input is usually connected to a sensor that detects a low level of labels on the unwind reel. Refer to the description of 'End of Reel Count' menu. See jumper J3 for input polarity selection. TB1/6 on a Monitor adapter board. T1/3 on a Unitron adapter board.

IN4 – Printer OK/Safety Circuit Monitor

If the "1000M" bit in Option2 is off, this input is connected to the printer OK/fault output of the printer controlled by the Monitron. When the printer is enabled by the printer menu or the 'D' command with an odd value this input must be on otherwise labelling is disabled and the "Printer Error" is displayed. If an even value is used in D the

input must be off for printer OK. The 'P' bit in Option Port 2 also controls the polarity. As of V3.19A the printer fault input is only checked just after the label dispense is completed. This allows it to possibly serve as an actual print confirmation input (from a contrast scanner for instance) or just a simple printer fault signal monitor. If the "1000M" bit in Option2 is set this input becomes the Safety Circuit Monitor. In his mode, if the input is on, labelling is disabled and the "Safety Circuit Open" fault is displayed. See jumper J4 for input polarity selection. Pin 2 of CON3 on a Monitor adapter board. T1/4 on a Unitron adapter board.

IN5 – Drive OK

This input is normally connected to the drive fitted inside the Monitron. It disables labelling and shows a fault screen when it is off. However, it is not wired in a Monitor or Unitron but is still available on TB1/7 of the Monitor adapter board or T1/5 on a Unitron adapter board.

IN6 – Fault In(Bussed Fault In)/External Disable

If the "1000M" bit in Option2 is off, this input disables the labelling when on and displays the "External Fault" message. If the "1000M" bit in Option2 is set this input becomes the "External Disable" input. In this mode the "Labelling Disabled by External Input" message is displayed and it automatically resets when the input is tuned off. See J6 for input polarity selection. TB1/8 on a Monitor adapter board. T1/6 on a Unitron adapter board.

Outputs

All outputs signals that are available on a Servotron are present however only some are wired to the connectors on the rear. This is to maintain compatibility with the original Monitor. The signals not brought out to the rear panel are available on the adapter board. They are selectable for NPN or PNP however they must all be one or the other. Selection is made by changing IC9. For NPN use ULN2803A, for PNP use UDN2981A. Jumpers J9 and J10 must be set to suit. In a Monitron, the IC is PNP but the main outputs have slave transistors on the adapter board that provide a NPN output.

STEP – Step Signal

This output is used to drive the pulse input of the stepper drive. Internally connected to the drive in a Monitron.

OUT1 – Coder (Printer)

This output is the start trigger for a date coder etc. Option Menu selects whether the coder is of the type that prints while the web is stationary (e.g. hot stamp) or moving (e.g. ink jet). Terminal 6 on a Monitron.

OUT2 – Servo Enable/Stepper Boost

This output is connected internally to the stepper drive to control the boost function on the D550.

OUT3 – Feedscrew Enable/Monitron OK Output

As of V3.08 this output is provided to enable the feedscrew. It is on whenever there are no faults and no level pauses from the high outfeed and low infeed sensors. As of version S3.14 this output becomes an OK output whenever the level control are not enabled in the Analogue setup. It is on whenever there are no faults present. TB1/9 on a Monitor adapter boards. T2/1 on a Unitron adapter board.

OUT4 – Jig Solenoid/Knife Up Solenoid

This output controls the solenoid that closes the orient jig. Implemented in V3.02. As of version 3.18 this output can be used for a cutter knife up solenoid if Knife Mode is selected in the Option2 menu. A Monitor did not support jig mode so this output is connected to the Flap Adapter Output CON4 on the Monitor Adapter Board. It was very rarely used and is not supported in this version of firmware. T2/2 on a Unitron adapter board.

OUT5 – Air Blast/Knife Down Solenoid

When an air blast time is entered in the menu or with the K command, this output is turned on at the end of the product delay and before the servo starts to move. As of version 3.18 this output can be used for a cutter knife down solenoid if Knife Mode is selected in the Option2 menu. Terminal 11 on a Monitron.

OUT6 – Air Assist

This output is turned on at the start of the servo moving and off at the beginning of deceleration. Terminal 9 on a Monitron.

OUT7 – Bussed Fault Out

This output is turned on when there is a labeller fault, printer fault, servo fault, end of reel or Fault In is on. It only goes off when the fault has been reset or labelling is re-enabled. TB1/10 on a Monitor adapter board. T2/3 on a Unitron adapter board.

Rear Panel Connectors

Tuchel 16 way Rear Panel Connector

Connector Pin Number	Signal	Machine Terminal	Comment
1	Product Scanner	3	
2	Gap Scanner	4	Must be new 24 volt type
3	Ground	2	
4	No Connection	6	5.5 volts for old gap scanner not supported
5	Ground	5	
6	Printer	7	
7	24 Volts	1	Use for scanner power
8	No Connection		24 Volts in an ex Unitron
9	Air Assist	9	
10	24 Volts for above	8	Special unregulated voltage in an ex Monitor
11	Air Blast	11	
12	24 Volts for above	10	Special unregulated voltage in an ex Monitor
13	No Connection		
14	No Connection		
15	No Connection		
16	Master Encoder	16	Only wired to adapter board in an ex Unitron

Stepper Motor Rear Panel Connector for original 5 phase motor

Connector Pin Number	Signal	Stepper Drive Pin	Comment
A	W2E	20c	Winding 2 Start
B	W4E	22c	Winding 4 Start
C	W1A	24c	Winding 1 Finish
D	W3A	26c	Winding 3 Finish
E	W5A	28c	Winding 5 Finish
F	W1E	20a	Winding 1 Start
G	W3E	22a	Winding 3 Start
H	W5E	24a	Winding 5 Start
I	W2A	26a	Winding 2 Finish
J	W4A	28a	Winding 4 Finish

Monitor Adapter Board Connectors

Monitor Adapter Board Terminal Strip CON1

Terminal Number	Signal	Description
1	6V	6 volts from Power Supply. (Used for backlight)
2	N.C.	
3	0V	0 volts from Power Supply
4	0V	0 volts from Power Supply
5	11V	11 volts from Power Supply. (Used for 5V)
6	11V	11 volts from Power Supply
7	N.C.	
8	24V	24 volts from Power Supply
9	Ext 24V	9 and 10 should be bridged on rear of PCB
10	Ext 24V	

Monitor Adapter Board Terminal Strip CON2

Terminal Number	Signal	Description
1	24V	
2	Ext 24V	
3	Ext 24V	
4	0V	
5	0V	
6	GapSense	Label Gap Sensor Input
7	ProdSense	Product Sensor Input
8	TFM+14V	Only used in DC Monitrons
9	StepOut	Step Output to Stepper Drive
10	N.C.	
11	0V	
12	N.C.	
13	AirAssist	Air Assist Solenoid Output
14	AirBlast	Air Blast Solenoid Output
15	Printer	Printer Output
16	BoostOut	Boost Output to Stepper Drive

Monitor Adapter Board Terminal Strip TB1

Terminal Number	Signal	Description
1	Spare 1	Depends on Option Board (RS-232 TxD)
2	Spare 2	Depends on Option Board (RS-232 RxD)
3	Spare 3	Depends on Option Board
4	IN 1	Colour Sensor (Product Sensor 2)
5	IN 2	Jig In Sensor / Product Gate
6	IN 3	Fixed Pull
7	IN 5	Servo OK
8	IN 6	Disable
9	OUT 3	Missing Label
10	OUT 7	Fault
11	ENC	Master Encoder
12	Flap Adapt	Flap Adapter (Driven by OUT4)
13	+24Vdc	
14	0V	

Note: This terminal strip not normally fitted.

Unitron Adapter Board Connectors

Unitron Adapter Board Terminal Strip TB1

Terminal Number	Signal	Description
1	GapSense	Label Gap Sensor Input
2	0V	
3	ProdSense	Product Sensor Input
4	Spare8	Depends on Option Board fitted.
5	Enc	Master Encoder Input
6	N.C.	
7	0V	
8	24V	

Unitron Adapter Board Terminal Strip TB2

Terminal Number	Signal	Description
1	AirBlast	Air Blast Solenoid Output
2	AirAssist	Air Assist Solenoid Output
3	Printer	Printer Output
4	StepOut	Step Output to Stepper Drive
5	BoostOut	Boost Output to Stepper Drive
6	N.C.	
7	24V	
8	0V	
9	24V	
10	0V	

Unitron Adapter Board Terminal Strip TB3

Terminal Number	Signal	Description
1	24V	24 volts from Power Supply
2	0V	0 volts from Power Supply
3	5V	5 volts from Power Supply
4	Gnd	5V Ground from Power Supply
5	+15V	+15 volts from Power Supply
6	0V	0 volts from Power Supply
7	0V	0 volts from Power Supply
8	-15V	-15 volts from Power Supply

Unitron Adapter Board Terminal Strip T1

Terminal Number	Signal	Description
1	IN1	Colour Sensor Input (Product Sensor 2)
2	IN2	Jig In Sensor Input (Product Gate)
3	IN3	End of Reel Sensor Input
4	IN4	Printer OK Input
5	IN5	Drive OK Input
6	IN6	Fault Input
7	Spare1	Depends on Option Board fitted.
8	Spare2	Depends on Option Board fitted.
9	0V	

Unitron Adapter Board Terminal Strip T2

Terminal Number	Signal	Description
1	OUT3	Feedscrew Enable Output
2	OUT4	Jig Solenoid Output
3	OUT7	Bussed Fault Output
4	Spare3	Depends on Option Board fitted.
5	Spare4	Depends on Option Board fitted.
6	Spare5	Depends on Option Board fitted.
7	Spare6	Depends on Option Board fitted.
8	Spare7	Depends on Option Board fitted.
9	0V	

Note: T1 and T2 are to duplicate the terminal strips on the Layson External I/O Board. Although T1 is inputs and T2 is outputs the features they supported are not necessarily supported by the Monitron.

Configuration

InStep II PCB Jumper Descriptions

Jumper	Description	Default
J1 to J8	These three point jumpers select the polarity of the signal required to operate the inputs. Jump 1 to 2 for sinking (NPN) type input devices. Jump 2 to 3 for sourcing (PNP) type input devices. J1 to J6 correspond to input 1 to 6 respectively. J7 is for the product sensor input. J8 is for the label sensor input.	J1 to J7, 2 to 3 jumpered. J8, 1 to 2 jumpered.
J9 and J10	These jumpers are set to match the type of output driver IC installed in position IC9. Jump both 1 to 2 for NPN type IC (ULN2803A) Jump both 2 to 3 for PNP type IC (UDN2981A) Note: jumpers must be set correctly or damage will result!	2 to 3 jumpered
J11	Install Jumper 11 when 5 volt encoder is used. J12/13 must be in	Not fitted

	PNP configuration when this jumper is installed!	
J12 and J13	These jumpers are set to match the polarity of the output of the master encoder connected to terminal 11. Jumper J12 and J13 1 to 2 for NPN output encoders. Jumper J13 2 to 3 and J12/1 to J13/1 for PNP output encoders.	J12, 1 to 2 jumpered J13, 1 to 2 jumpered
J14 to J24	These jumpers set the master encoder divisor. J14 is divide by one, J15 is divide by 2 through to J24 which is divide by 1024. Only one jumper in this set to be installed!	J18 installed
J25	Selects the function on pin 28 on P1. Refer to option manual.	2 to 3 jumpered
J26	Selects whether to bypass the encoders optocoupler. 1 to 2 is to use optocoupler, 2 to 3 is to bypass the optocoupler.	1 to 2 jumpered

Monitor Adapter Board Jumpers

Jumper	Description	Default
A,B	Jump A to provide NPN output on CON2 pin 16 for stepper boost signal. Jump B to provide PNP 14 volt output on CON2 pin 16 for TFM enable, 14 volts must be brought in on CON2 pin 8. Only one jumper to be installed!	A jumpered
CON3	IN4. Provided to copy original PCB. Not sure what it was used for. Possibly gap edge select, not supported in software. Is actually the printer OK input in the current firmware.	N/A
CON4	OUT4. Flap Adapter Output. Has BD681 NPN driver. Flap adapter not supported, is actually Jig Solenoid in current firmware.	N/A
CON5	OUT6. Air Assist Output. Often used to drive label counter.	N/A

Stepper Drive DIP Switch

	Berger Lahr D550		Layson L550	
Switch	**Use**	**Description**	**Use**	**Description**
1	Boost/PWM	Off = Boost Control	Step Angle	?? = Full Step (500 steps)
2	Current Reduction	Off = Current Reduction On	Direction	?? = Clockwise
3	Direction	Off = Counter Clockwise	Not Used	
4	Step Angle	Off = Half Step (1000 step)	Not Used	

Rotary switch on D550 set to F for maximum current.

LCD Contrast

Near the bottom corner of the InStep II PCB there is a small adjustment potentiometer to adjust the liquid crystal displays contrast. The display contrast is directly affected by the ambient temperature and as such may require adjustment in extreme temperature environments.

Monitron Version Update Summary

As the firmware installed in the current model stepper drive Monitrons is the same as the Servotron, please refer to the Servotron User Manual.

Integrated Drive Stepper Motor Notes

When this type of motor is used there is a small adapter board fitted in place of the stepper drive in the Monitron control box. This is wired across to a small board fitted onto the pin headers on the Monitron adapter board on the floor of the box. On the adapter board there are two jumpers to set the direction of the motor. They must BOTH either be set to the right or BOTH set to the left to select the appropriate motor direction. The old motor cable is usually reused and wired into the new motor. The following table shows the new usage and the entire connection from the old drive connector through to the new connections inside the new motor. The switch settings inside the motor are shown here also.

Monitron Integrated Drive Stepper Motor Cable							
This chart is used when wiring an integrated drive stepper motor to a Monitron controller							
D550 Socket	**Rear Panel Socket**	**Cable Wire Colour**	**Cable Wire Number**	**New BL Motor Signal**	**CN1**	**CN2**	**CN4**
20c	A	Red	4	(-)	0VDC		
22c	B	Black	8	Step-		12	
24c	C	Yellow	1	Step+		6	
26c	D	Orange	5	Fault			3
28c	E	Brown	9	(+)	VDC		
20a	F	White	2	(-)	0VDC		
22a	G	Green	6	Enable-		10	
24a	H	Violet	Earth	Enable+		4	
26a	I	Blue	3	Direction-		11	
28a	J	Grey	7	Direction+		5	
	S1	1-Off	**S4**	F			
		2-On					
		3-On					
		4-On					
	S3	1-On	**S2**	1-Off			
		2-Off		2-On			
		3-Off		3-On			
		4-Off		4-On			

S1 selects motor for 1000 pulses per revolution. The layout of the four switches in the table above represents the physical layout in the motor itself.

For CN1, Ov is the top of the ‘T’ and VDC is the “leg” of the ‘T’

For CN4, pin 1 is in the top left, then 1, 2, 3 across the 4 is next to 1. This makes 5 near the key.

For CN2, pin 1 is on the top right then count down. Start again at the top for pin 7. This makes 9 and 10 near the key

InStep Labelling Modes and Sequence Chart

Step No.	Step	Comments
1	Product Input On	All modes except Jig Only/Orient and Man Dispense
2	Product Gate Input On[1]	Only if selected on option port (InStep I J31 or InStep II bit 7)
3	Jig Delay	Jig Control Mode Only[2] (Jig Delay > 0)
4	Jig Solenoid Output On	Jig Control Mode Only (Jig Delay > 0)
5	Jig In Input Off[3,4] (Jig In)	Jig modes only (Jig Only/Orient Mode starts here) (S U D > 0)
6	Spin Up Delay[5]	Orient jig mode only (Spin Up Delay > 1)
7	Colour Sensor/Prod 2 Input[6]	Orient jig mode only (Spin Up Delay > 1)
8	Label Position Delay	All modes except manual release
9	Air Blast Output On	Air Blast Mode Only (Man Dispense starts here) (AB Time > 0)
10	Air Blast Time	Air Blast Mode Only (Air Blast Time > 0)
11	Air Blast Output Off	Air Blast Mode Only (Air Blast Time > 0)
12	Air Assist Output On	All modes
13	Acceleration	All modes (Except 2nd label of two label set as of V3.07)
14	Printer Output Off/On	Only if Printer enabled (D > 1) (Off/On selected on option port)
15	Run in Sync or Set Speed	All modes
16	Gap Sensor Input On	All modes
17	Label Advance[7]	All modes (Gets setting from t command on 1st label of 2 label)
18	Air Assist Output Off	All modes
19	Two Label Spacing Delay	Two Label Mode Only (Two Label Spacing > 0)
20	Back to step 9 on first pass	Two Label Mode Only (Two Label Spacing > 0)
21	Deceleration	All modes (Prior to V1.18C was done on 1st label of 2 label set)
22	Knife Down On/Up Off	Knife Mode Only (Option2 bit 4 on and Knife Down Time > 0)
23	Knife Down Time	Knife Mode Only (Option2 bit 4 on and Knife Down Time > 0)
24	Knife Up On/Down Off	Knife Mode Only (Option2 bit 4 on and Knife Down Time > 0)
25	Jig Hold Delay	Jig Control Mode Only (Jig Delay > 0)
26	Jig Solenoid Output Off	Jig Control Mode Only (Jig Delay > 0)
27	Printer Output On/Off	Only if Printer enabled (D > 1) (Off/On selected on option port)
28	Product Input Enabled	Only if labelling still enabled (E = 1)

[1] If selected, the Gate Input must be on at the instant of the product sensor coming on or the sequence will restart. Therefore, the timing is always controlled by the Product Sensor Input.

[2] When using Jig Control Mode you must select either Jig Only or Orient Jig Mode as well. If not, the sequence will stall after the Jig Solenoid is turned on.

[3] The sense of the Jig In Sensor Input has been changed so that off = jig in. This was done to allow the use of a more standard N.O. proximity sensor in the orient jig mechanism.

[4] Because the Product Gate and Jig In share the same input, it is not practical to have both enabled at the same time. However, this is not normally a limitation as gating is usually only used on a rotary type machine where an orientation jig cannot be fitted

[5] The Spin Up Delay is used to ensure the product is spinning smoothly in the jig before the Colour Sensor/Prod 2 is enabled. This prevents false triggers from the Colour Sensor.

[6] Sending anything over serial port or pressing any button while waiting for the colour sensor input to be activated will cause the sequence to reset without dispensing. As of version S3.17C re-activation of product scanner while the previous product is still in the jig will cause an ‘Orientation Error’.

[7] In Fixed pull mode steps 15 and 16 are bypassed and the advance is loaded with the fixed pull length minus the acceleration length. It is not intended that it be used in conjunction with the jig modes or two label mode.